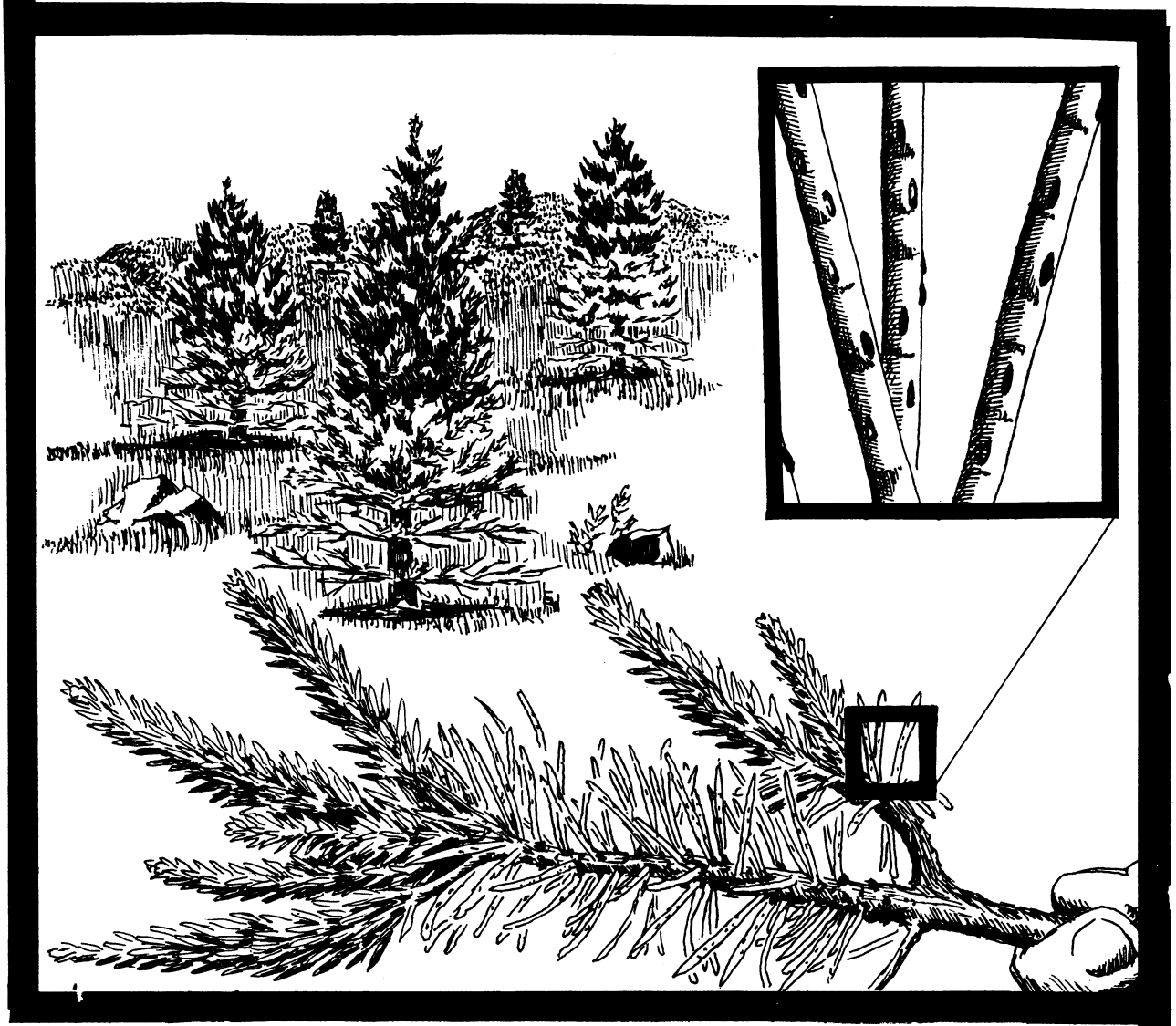
US DEPARTMENT OF AGRICULTURE

FOREST SERVICE

RESULTS OF A PILOT TEST FOR CONTROL OF LOPHODERMIUM NEEDLECAST ON SCOTCH PINE CHRISTMAS TREES



A COOPERATIVE PILOT TEST BETWEEN

Northeastern Area State and Private Forestry

AND

Vermont Department of Forests and Parks

RESULTS OF A PILOT TEST FOR CONTROL OF LOPHODERMIUM NEEDLECAST ON SCOTCH PINE CHRISTMAS TREES

by

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Lophodermium needlecast, a foliage disease of hard pines caused by the fungus Lophodermium pinastri (Schrad. ex Fr.) Chev., has in recent years been highly damaging in nurseries and plantations throughout much of the United States. It is now common and of increasing concern to Scotch pine Christmas tree growers in the Northeastern States. The severity of the disease in the Lake States prompted intensive research on the problem. This research resulted in effective disease control methods using fungicides.

Due to environmental similarities between the Lake States and Northeastern States, it is likely that the Lake States suppression methods should apply in the Northeast. Accordingly, the Vermont Department of Forests and Parks and the Northeastern Area, State and Private Forestry cooperatively pilot tested maneb and chlorothalonil in a Scotch pine plantation at Bakersfield, Vermont.

PROCEDURE

During the last week of May 1973, treatment plots were laid out and pretreatment evaluations of disease severity completed. Seven acres of the Scotch pine plantation were divided into three sections according to the severity of the disease in particular areas of the plantation: light, medium, and heavy. Each section was subdivided into nine plots averaging about 1/4 acre each to provide three replications of three treatments in each severity class:

3 area severity classes (light, medium, heavy)

3 treatments (chlorothalonil, maneb, control)

3 replications

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27 plots

Plot boundaries were delineated with string.

Fifteen trees were arbitrarily selected in each plot for disease evaluation. Trees qualified for selection only if they were infected with L. pinastri,

but had not yet suffered excessive branch mortality. Each selected tree was tagged for future identification and one-year-old foliage was evaluated for disease severity as follows:

Numerical Value	Damage Description	Narrative Standard
0	Uninfected	Healthy
1	Light	Less than 10% of needles infected in lower half of crown; no more than a trace of infection in upper half.
2	Medium	Ten to 30% infection in lower half of crown and less than 10% infection in upper half.
3	Heavy	Over 30% infection in lower half of crown and over 10% in upper half.

This rating system was also used for post-treatment evaluations on May 21, 1974.

Fungicide applications were made in accordance with the recommendations of Skilling and Nicholls (1). Chemicals were applied three times: July 24 - 26; August 13 and 14; September 11 and 12. The chlorothalonil (Daconil 2787) and maneb (Maneb 80 WP) were each applied by back-pack mist-blower at a rate of six pounds per 100 gallons of water. Four ounces of surfactant were added to each 100 gallons of the maneb formulation. All the trees in a plot were sprayed until completely moistened. This required slightly over 40 gallons per acre. Control plots were not sprayed.

RESULTS

Average disease severity ratings were substantially reduced in plots treated with maneb and chlorothalonil. In contrast, disease severity increased in untreated plots (Table 1).

Table 1. Average pre- and post-spray disease ratings grouped by treatment and area severity.

Area Severity Rating	Treatment					
	Maneb		Daconil		Control	
	Pre-	Post-	Pre-	Post-	Pre-	Post-
Light	1.5	0.2	1.5	0.4	1.4	1.7
Medium	1.6	0.1	1.9	0.4	1.6	2.2
Heavy	2.4	0.7	2.4	1.1	2.5	2.6
Average	1.8	0.3	1.9	0.6	1.8	2.2

The maneb and chlorothalonil data were subjected to a Chi-square test to determine whether a significant difference existed between the two fungicide treatments. The computed Chi-square value of 18.91 (significant at P = .01) indicates that maneb provided better protection. A large number of 0 post-treatment ratings for maneb-treated trees contributed to the high Chi-square value.

DISCUSSION

Statistically, maneb was the more effective of the two fungicides used in this test, but both reduced infection substantially. We considered disease severity ratings of 0 and 1 generally acceptable from the standpoint of Christmas tree marketability. Most treated trees fell in these two low severity categories following treatment: maneb (95%) and chlorothalonil (93%) versus controls (26%). We purchased maneb for less than half the cost of chlorothalonil; on the other hand, maneb requires a surfactant, but chlorothalonil does not.

L. pinastri can infect one-year-old as well as current year needles. This was quite noticeable in the test plantation. Compared to controls, it was evident that both fungicides reduced infection of the older foliage, but not as effectively as with the current needles. These older needles are of comparatively less importance at the time of Christmas tree sale.

The results of this pilot test indicate that the recommendations of Skilling and Nicholls (1) are applicable in the Northeast. This includes number and timing of fungicide applications as a general recommendation for a season of normal weather conditions. Unusually wet weather might require an additional application, possibly in late September or early October.

CONTROL RECOMMENDATIONS

The fungicide control recommendations of Skilling and Nicholls (1) are repeated below:

What to Spray

Two fungicides are currently registered for control of Lophodermium needlecast: chlorothalonil (tetrachloroisophthalonitrile) (Bravo W-75, Daconil 2787, Bravo 6F) and maneb (manganese ethylene bisdithiocarbamate) (Manzate 200, Manzate D, Dithane M-22). Both are easy to handle, non-corrosive to spray machinery, relatively safe, and have proved effective in controlling Lophodermium in tree nurseries and Christmas tree plantations. And both are compatible with wettable powder formulations of most commonly used fungicides, insecticides, and miticides. Follow label for emulsifiable formulations.

Apply either fungicide at rate of 2 1/2 pounds per 100 gallons of water in hydraulic spray equipment or six pounds per 100 gallons in high-pressure mist-blower. Use four ounces of a surfactant (such as DuPont spreader-Sticker) per 100 gallons of water for maneb. No spreader-sticker is needed for chlorothalonil.

How to Spray

A sprayer must have a working pressure sufficient to completely moisten all tree foliage. Hydraulic sprayers use about 100 gallons per acre; mist-blowers use about 40 gallons per acre. A large air-blast mist-blower is the most economical equipment to use providing there are no more than 20 rows of trees between roadways and the trees are sprayed from both sides. Spray should not be applied when it is windy or rainy.

When to Spray

In moderately to heavily infected plantations (hundreds to thousands of infected trees), apply spray three times: about July 25 (when new foliage is elongated), about August 15, and about September 10.

In lightly infected plantations (less than 100 trees infected), apply sprays on August 1 and September 1. (Skilling and Nicholls have advised us of their revised recommendations which call for three sprays for infected plantations regardless of disease severity; they also suggest a fourth application in late September or early October if the season is unusually wet.)*

Do not spray plantations that do not show signs of Lophodermium infection.

* Personal communication with Dr. T. H. Nicholls.

LITERATURE CITED

1. Skilling, D. D., and T. H. Nicholls. 1973. Controlling Lophodermium needlecast on Scotch pine Christmas trees. USDA, Forest Service Research Note NC-150, 4p.

ACKNOWLEDGEMENTS

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The use of trade names in this report is for the information and convenience of the reader. Such does not constitute an official endorsement or approval of any product by United States Department of Agriculture or Vermont Department of Forests and Parks to the exclusion of others which may be suitable.

PESTICIDE PRECAUTIONARY STATEMENT

Pesticides used improperly can be injurious to man, animals, and plants. Follow the directions and heed all precautions on the labels.

Store pesticides in original containers under lock and key--out of the reach of children and animals--and away from food and feed.

Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish, and wildlife. Do not apply pesticides when there is danger of drift, when honeybees or other pollinating insects are visiting plants, or in ways that may contaminate water or leave illegal residues.

Avoid prolonged inhalation of pesticide sprays or dusts; wear protective clothing and equipment when specified on the container.

If your hands become contaminated with a pesticide, do not eat or drink until you have washed. In case a pesticide is swallowed or gets in the eyes, follow the first-aid treatment given on the label, and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove clothing immediately and wash skin thoroughly.

Do not clean spray equipment or dump excess spray material near ponds, streams, or wells. Because it is difficult to remove all traces of herbicides from equipment, do not use the same equipment for insecticides or fungicides that you use for herbicides.

Dispose of empty pesticide containers promptly. Have them buried at a sanitary land-fill dump, or crush and bury them in a level, isolated place.

NOTE: Some States have restrictions on the use of certain pesticides. Check your State and local regulations. Also, because registrations of pesticides are under constant review by the Federal Environmental Protection Agency, consult your county agricultural agent or State extension specialist to be sure the intended use is registered.